

VALIDATION OF NEW SUPRAGENERIC NAMES IN PINOPHYTA

Alexander B. Doweld

National Institute of Carpology (Gaertnerian Institution), PO Box 72, RUS-119517,
Moscow, RUSSIAN FEDERATION

&

James L. Reveal

Norton-Brown Herbarium, H.J. Patterson Hall, University of Maryland, College
Park, Maryland 20742-5815 U.S.A.

ABSTRACT

The long-used class name, **Taxopsida**, is validated and the class name **Podocarpopsida** and subclass **Podocarpidae** are proposed as new. The monogeneric family **Saxegothaeaceae** is validated and segregated into its own, new order **Saxegothaeales**. The order is expanded to include a new monogeneric family **Microcachrydaceae** based on the endemic Tasmanian genus *Microcachrys*.

KEY WORDS: Pinophyta, Microcachrydaceae, Podocarpopsida, Podocarpidae, Saxegothaeaceae, Saxegothaeales, Taxopsida, nomenclature, gymnosperms, Podocarpaceae

In a forthcoming book by Doweld, *Reproductive Morphology of Seed Plants*, several new suprageneric names in Pinophyta Cronq., Takht., et Zimmerm. ex Reveal, are required for a modified system of classification of the division based on new studies and data compiled on the morphology and anatomy of the male and female reproductive structures. Two previously suggested but invalidly published names, Taxopsida and Saxegothaeaceae, are validated herein and attributed to the first person to have suggested the name. A new class and subclass, based on the widespread genus *Podocarpus* L'Hér. ex Pers., are proposed as coordinate taxa for the new proposed Taxopsida and the already established Pinidae Cronq., Takht. et Zimmerm. and Taxidae Ehrend. ex Reveal. In addition to Saxegothaeaceae, we establish the family Microcachrydaceae and place both in a new order, Saxegothaeales. We note that Farjon & Mill (1999) have proposed conservation of the orthography *Saxegothaea* over Lindley's original *Saxe-Gothaea*. The proposal may not be necessary as Art. 60,

Prop. HH (Greuter & Hawksworth 1999), if approved at the next Botanical Congress, will alter automatically the orthography of *Saxe-Gothaea* to *Saxegothaea*. We are using *Saxegothaeales*, *Saxegothaeaceae*, and *Saxegothaea* in anticipation of adoption of one of these proposals following Rec. 14A of the *International Code of Botanical Nomenclature* (Greuter *et al.* 1994).

In adopting Gausson's (1979: p.6) concept that the conifers (his "Coniferae") consist of three distinct "megaphyla" or "ensembles" (his "Pinodines," "Taxines," and "Podocarpines"), we establish the two new classes, *Taxopsida* and *Podocarpopsida*, in accordance with the rules and ranks established by the *International Code of Botanical Nomenclature* (Greuter *et al.* 1994). *Taxopsida* (originally suggested by Florin [1944, 1948a, 1948b, as "Taxales" or "Taxineae"], Pilger & Melchior [1954] and Pant [1959] - all invalidly published [Art. 32.1(c), 36.1]) with arillate seeds represents a distinct taxon within gymnospermous seed evolution, being rooted among the extinct cupular pteridosperms (Lyginopteridophyta). The origin of the *Podocarpopsida* with their peculiar epimatial structures around the seed is thought to be among the extinct cone-bearing *Walchiaceae-Voltziaceae* assemblages, having a detached, but common origin with the extant *Pinopsida* Burnett (*e.g.*, *Araucariaceae* of *Pinopsida* is linked to *Saxegothaeales* of *Podocarpopsida* by their strobilar structures). The problems associated with the origins and phylogenetic interrelationships of the three classes of *Pinophyta* will be addressed more extensively in Doweld's new book.

The family name *Saxegothaeaceae*, originally suggested but not validated by Gausson (1974a, 1974b, 1976), is validated to accommodate the Chilean genus *Saxegothaea* Lindl. The new family differs from the remainder of *Podocarpaceae* (excluding the anomalous Tasmanian genus *Microcachrys* Hook.f.) by their taxaceous habit, cone-like aggregations of female strobili and amentaceous male strobili, and other characters as noted by Gausson. It is noteworthy that in proposing the illegitimate name *Squamataxus* for *Saxegothaea*, Nelson (1866: 168) emphasized the similarities of likeness of their bracteose strobili with the fleshy ones in *Taxus* L. By taking into account these differences, it is proposed that *Saxegothaeaceae* be maintained apart from the other families of *Podocarpaceae* Pulle *ex* Reveal (*Pterosphaeraceae* [Pilg.] Nakai, *Podocarpaceae* Endl., *Nageiaceae* Fu, and the recently established *Acropylaceae* Bobr. & Melik.) by placing them in their own order, *Saxegothaeales*. The recognition of *Saxegothaeaceae* brings into question the relationship of the arborescent Chilean genus *Saxegothaea* with the shrubby Tasmanian genus *Microcachrys*. In addition to their distinct habit, the several morphological differences in their reproductive structures (Morvan 1990) and the numerous differences in their vegetative features leads us to establish a new monogeneric family, *Microcachrydaceae*, for the isolated endemic. We hereby assign *Microcachrydaceae* to the *Saxegothaeales*.

Taxopsida R. Florin & Doweld *et* Reveal, *class. nov.* TYPUS: *Taxus* L., *Sp. Pl.* 2:1040. 1753.; *Taxaceae* Gray, *Nat. Arr. Brit. Pl.* 2:222, 226. 1821., *nom. cons.*

Ab classis *Pinopsida* habitum fruticibus vel arbusculis ramosissimis, lignum pycnoxylicum resiniferum, tracheidas spirales tertiarias, lepides nullae, 'stamina' squamata peltataque, microsporangiis 2-8, unilocularibus, grana pollinis asaccata, ovula solitaria vel cum brachyblasto squamoso, semina

drupacea, erecta in conos squamosos conferta, arillo bracteisve adnata, embryonibus dicotyledoneis differt.

Podocarpopsida Doweld & Reveal, *class. nov.* TYPUS: *Podocarpus* L'Hér. ex Pers., *Syn. Pl.* 2:580. 1807., *nom. cons.*; Podocarpaceae Endl., *Syn. Conif.* 203. 1847., *nom. cons.*

Ab classis Pinopsida habitum fruticibus ramosis vel raro arboribus, foliis spiraliter dispositis, vel planis latisque, lanceolatis vel ovoideis, nervatione parallela, interdum phyllocladiis; conos lignescentes nullos, strobilis femineis in aggregationes oligomeras vel rarius polymeras confertis; ovula erecta vel plerumque inversa, epimatio cincta vel varie connata (raro nullo: Pterosphaeraceae); semina singula in axillis megasporophyllorum strobilarium disposita differt.

Saxegothaeales Doweld & Reveal, *ord. nov.* TYPUS: *Saxe-Gothaea* Lindl., *J. Hort. Soc. London* 6:258. 1851.; Saxegothaeaceae Gaussen ex Doweld et Reveal, *Phytologia* 84:365. 1999.

Arbores vel frutices; folia plana, acicularia, spiraliter disposita vel squamiformia, decussata; strobili masculi amentiformes, microsporangia 2; strobili feminei polyspermi, squamosi; semina inversa, epimatio membranaceo laterali cincta.

Saxegothaeaceae Gaussen ex Doweld & Reveal, *fam. nov.* TYPUS: *Saxe-Gothaea* Lindl., *J. Hort. Soc. London* 6:258. 1851.

Arbores sempervirentes, monoicae; rami patentes, subverticillati; folia sparsa, linearia, plana, cum nervo longitudinali minuto, basi fere in petiolum brevem angustata; strobilis masculis bractae microsporangiferae dilatato-acuminatae, microsporangia 2, unilocularia, longitudinaliter dehiscentia; strobili feminei amentiformes subcapitati, bractae plures, lanceolatae, inferne connatae, inferiores et supremae steriles, fertiles 1-2, monospermae; semen inversum, epimatio non connatum (cinctum).

Microcachrydaceae Doweld & Reveal, *fam. nov.* TYPUS: *Microcachrys* Hook.f., *London J. Bot.* 4:149. 1845.

Frutices dioici, prostrati, ramosi, ramulis e foliis arcte imbricatis tetragonis; strobili masculi in amenta ovali-oblonga conferti, bractae microsporangiferae ovato-orbiculatae; microsporangia 2, stipitata, connectivo curvato ultra oculos producto; strobili feminei amentiformes, bractae arcte imbricatae ovato-rhomboidae; megasporophyllum succulentum; semina minutissima ovoidea, epimatio laterali a basi ad medium cincta (non connata).

In order to maintain coordinate ranks among the Pinophyta, the following name is required.

Podocarpidae Doweld & Reveal, *subcl. nov.*, validated by a full and direct reference to the Latin description associated with a validly published Endlicher (*Syn. Conif.* 203. Mai-Jun 1847, as Podocarpaceae ["Podocarpeae"]) family name. TYPUS: *Podocarpus* L'Hér. *ex Pers.*, *Syn. Pl.* 2:580. 1807., *nom. cons.*; Podocarpaceae Endl., *Syn. Conif.* 203. 1847., *nom. cons.*

ACKNOWLEDGMENTS

We wish to thank Dan H. Nicolson and Kancheepuram N. Gandhi for their comments and review of the manuscript. The research is a contribution to the Systema Spermatophytorum Project of the National Institute of Carpology (Gaertnerian Institution), Moscow. This study is part of the Indices Nominum Supragenericorum Plantarum Project from the Norton-Brown Herbarium (MARY) and presented with the co-operation of the International Association for Plant Taxonomy and the National Agricultural Library.

LITERATURE CITED

- Farjon, A. & R.R. Mill. 1999. Proposals to conserve the spelling of two generic names of conifers. *Taxon* 48:151-154.
- Florin, R. 1944. Die Koniferen des Oberkarbons und des unteren Perms. 7. *Palaeontographica* 85B:457-654.
- _____. 1948a. On the morphology and relationships of the Taxaceae. *Bot. Gaz.* 110:31-39.
- _____. 1948b. Enumeration of gymnosperms collected on Swedish expeditions to western and north-western China in 1930-1934. *Acta Horti Bergiani* 14:343-384.
- Gaussen, H. 1973. Familles sauf Podocarpaceés. *Trav. Lab. Forest. Toulouse*, Tome I, 13(12):8.
- _____. 1974a. Les Podocarpaceés, sauf les Podocarpaceés. *Trav. Lab. Forest. Toulouse*, Tome I, 13(19):1-36.
- _____. 1974b. Les Podocarpaceés autres que *Podocarpus* ss. *Trav. Lab. Forest. Toulouse*, Tome I, 13(19):1-174.
- _____. 1976. Conclusions des Podocarpaceés. *Trav. Lab. Forest. Toulouse*, Tome I, 14(22):1-32.
- _____. 1979. Conclusions des Taxines. *Trav. Lab. Forest. Toulouse*, Tome I, 15(26):1-26.
- Greuter, W., F.R. Barrie, H.M. Burdet, W.G. Chaloner, V. Demoulin, D.L. Hawksworth, P.M. Jørgensen, D.H. Nicolson, P.C. Silva, P. Trehane, & J. McNeill (editors.). 1994. *International Code of Botanical Nomenclature adopted by the Fifteenth International Botanical Congress, Tokyo, August-September 1993*. *Regnum Veg.* 131.

- _____ & D.L. Hawksworth. 1999. Synopsis of proposals on botanical nomenclature - St. Louis 1999. A review of the proposals concerning the International Code of Botanical Nomenclature submitted to the XVI International Botanical Congress. *Taxon* 48:69-128.
- Morvan, J. 1990. Comparative development, structure and phylogeny of the female strobile on *Saxegothaea conspicua* Lindl. et *Microcachrys tetragona* Hook. (Podocarpaceae). *Compt. Rend. Acad. Sci. Paris, Sér. 3, Sci.* 310:651-656.
- Nelson, J. ("Senilis"). 1866. *Pinaceae: Being a Handbook of the Firs and Pines*. Published for the author by Hatchard and Co, London, Great Britain.
- Pant, D.D. 1959. The classification of gymnospermous plants. *Palaeobotanist* 6(1957):65-70.
- Pilger, R. & H. Melchior. 1954. XVI. Abteilung: Gymnospermae. Nacktsamer. (Archispermae.). *Engler's Syllabus*, ed. 12:312-344.